

Monte Carlo simulations for X-ray breast dosimetry using homogeneous and heterogeneous phantoms

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Monte Carlo simulations are used to provide an estimate of the Mean Glandular Dose (MGD) for X-ray Digital Mammography and Digital Breast Tomosynthesis, where digital breast phantoms made by a homogeneous mixture of adipose and glandular tissues are involved for X-ray dosimetry. Nevertheless, studies in literature suggest an overestimate of the MGD, since the gland is not distributed evenly in the breast volume.

In this work a GEANT4-based Monte Carlo code has been developed for creating heterogeneous breast phantoms for dosimetry, which involve geometrical shapes forming the gland tree. The breast models are then used to compute the MGD estimates.